Webinar CLASA

¿Cómo reiniciar de manera segura la cirugía electiva?  
Estrategias para reiniciar las cirurgias eletivas de forma segura 

How to safely resume elective surgery

Limitación electiva 
\( n=2350 \)

- Criterio hospital: 29%
- Solo Qx Prioritaria: 58%
- Otra: 7%
- Sin limitación: 6%
Cómo es la remuneración en A Latina? n=2350

Argentina y Colombia Salario <25%

Salario 42%
Mitad y mitad 13%
Otro 12%
Casos 33%
Non-Essential Surgery during COVID-19

March 13: ACS: Management of Elective Surgical Procedures
March 24: ASA-ACS-AORN: Surgical Review Committee for COVID-19 Related Surgical Triage Decision Making

https://covid19.healthdata.org/united-states-of-america
Non-Essential Surgery during COVID-19

March 13: ACS: Management of Elective Surgical Procedures
March 24: ASA-ACS-AORN: Surgical Review Committee for COVID-19 Related Surgical Triage Decision Making
April 16: White House: Opening Up America Again
April 17: ASA-ACS-AHA-AORN: Roadmap for Resuming Elective Surgery after COVID-19 Pandemic
April 18: SAMBA: Resuming Ambulatory Anesthesia Care
April 19: CMS: Re-opening Facilities to Provide Non-emergent Non-COVID-19 Healthcare – Phase I
Specialty specific guidances: ACS, AAEM, ASDA, ASHP

Roadmap: Resuming Elective Surgery after COVID-19 Pandemic

Timing: 14-day reduction in rate of new COVID-19 cases; sufficient personnel and resources to avoid crisis standard of care
Testing to protect staff & patient safety
• Patient testing policy: test accuracy & timing considerations to provide useful preop information as to COVID-19 status
• Testing N/A: create safe environment. COVID?- appropriate PPE
PPE & medical supplies adequate for planned types, #s ops/procedures

Prioritization Policy Committee
- Surgery, Anesthesiology and Nursing leadership
- Criteria for prioritization and implementation

Roadmap: Resuming Elective Surgery after COVID-19 Pandemic

Policies addressing care issues specific to COVID-19

Phase I- Preoperative: Reassess patient health status
- Patient readiness for surgery can be coordinated by anesthesiology-led preoperative assessment services.
  - Advanced directive discussions w surgeon.
  - Plan for postacute care.

Phase II- Immediate Preop: checklists, timeouts

Phase III- Intraop: presence for intub/extub, PPE, nonessential personnel

Phase IV- Postop: standardized protocols eg ERAS

Phase V- Post Discharge Care Planning: facility availability & safety

Data Collection and Management

COVID related Safety and Risk Mitigation— distancing, visitors, sanitation

COVID related HCW Well-being ; Patient Messaging

asahq.org | apsf.org

CMS Recommendations:
Re-opening Facilities to Provide Non-emergent Non-COVID-19 Healthcare: Phase I

CMS Guidance: Key Considerations

Evaluate **COVID-19 incidence** and trends in the area
Consider **Non-COVID Care (NCC) zones** to screen all patients, staff, visitors
- COVID-19 Sx, incl temperature checks
- Separate from other facilities to the degree possible
- Staff should not cross over between COVID and NCC zones

**PPE:** Healthcare providers and staff wear surgical facemasks at all times.
Patients wear a cloth face covering or surg mask. Conserve!

**Facility:** Distancing incl low pt volumes, sanitation, adequate supplies

**Testing:** When adequate laboratory testing capability is established,
- Patients should be screened before care.
- Staff working in these facilities should be regularly screened.

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**Resuming Ambulatory Anesthesia Care as Our Nation Recovers from COVID-19**

**Stepped approach** for reopening ASCs and other OP facilities, when:
- low incidence COVID admissions, trending decrease + cases, adequate PPE

“Be cautious in performing surgeries that have the potential of patients needing to transfer to a higher level of care."

Gradually **starting with low-risk, shorter procedures** and then moving to more advanced ones as the pandemic is monitored.

**Explore options for anesthesiologist-led remote preoperative evaluation** utilizing telemedicine platforms to minimize patient visits.
Barriers to Resuming Elective Surgery

Impact on professional safety
Impact on patients
  Willingness for care
  Safety? [informed consent]
Issues with COVID-19 tests and testing
  When are patients infectious?
  When are tests positive?
  How accurate are the tests?
  What does a “negative” test mean?

Issues with COVID-19 Tests and Testing
When are patients infectious?

Incubation period
5 days median
(2-11 days)


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Issues with COVID-19 Tests and Testing

*Virus shedding  *Antibodies

**Viral Shedding.** Have active disease.

- RT-PCR

**Antibodies.** Had infection.
- Immune?
- Test valid??

Wölfel R, et al. Nature Online April 1, 2020

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Issues with COVID-19 Tests and Testing

42 tests utilized in USA most under *Emergency Use Authorizations*

Clinical accuracy of test – If available:

- **Sensitivity (True Positive)** ‘Test positive, Patient sick’ ~ 90-98%
- **Specificity (True Negative)** ‘Test negative, Patient healthy’ ~ 63-90%

Real World issues- **Your World?**

- False negative: ‘Test negative, Patient sick’
- Issues with sampling, storage, test performance
- Turnaround time: one hour to several days
- Test capacity / day
- Limited availability – {CAP} approx 900 of its 8000 accredited facilities offer testing (11%)
- Supply shortages hamper test availability: swabs, reagents, PPE.

asahq.org | apsf.org
COVID-19 Testing - What Does It Tell

Clinical accuracy of test – If available:

• Sensitivity (True Positive)
  ‘Test positive, Patient sick’ ~ 90-98%

• Specificity (True Negative)
  ‘Test negative, Patient healthy’ ~ 63-90%

• Negative Predictive Value (Is negative test accurate?)
  – depends on prevalence COVID-19 in population
  – how frequent are “unknown +”: surgical caseload

63% specificity 2% prevalence NPV 99.2% Miss 4/500 ie 4/week?
15% (NY) NPV 93.6% Miss 6.4/100

Roadmap for Resuming Elective Surgery
Steps to Establish Your Plan

• Assess local prevalence of COVID-19
• Assess resource availability
  Workforce Facilities & Supplies PPE Testing
• Develop your governance team
• Develop local policies to guide implementation and case prioritization

Safety First!
Daily OR Management
For Elective Surgery
During COVID-19 Pandemic

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Professor, Department of Anesthesia
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Financial Disclosure

- I am employed by the University of Iowa, in part, to consult and analyze data for hospitals, anesthesia groups, and companies
- Department of Anesthesia bills for my time, and the income is used to fund our research
  - I receive no funds personally other than my salary and allowable expense reimbursements from the University of Iowa, and have tenure with no incentive program
  - I own no healthcare stocks (other than indirectly through mutual funds)
Infographic Summary for
Aerosol Generating Procedures

**DAILY OR MANAGEMENT DURING COVID-19 PANDEMIC**

1. Relatively long staff shifts (e.g. 12-hour)
2. Initial phase I post-anesthesia recovery in OR after general anesthesia
3. Multimodal cleaning (UV-C) after each aerosol generating surgery

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Dexter F, Elhakim M, Loftus RW, Seering MS, Epstein RH 2020
*Journal of Clinical Anesthesia*
DOI: 10.1016/j.jclinana.2020.04.064
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3. Multimodal cleaning (UV-C) after each aerosol generating surgery

Oropharyngeal or nasopharyngeal samples

Sputum samples

Mean (SE)

Wang Y et al. Lancet 2020

Mean (SE)

Wang Y et al. Lancet 2020
Oropharyngeal or nasopharyngeal samples

Sputum samples

Wang Y et al. Lancet 2020
Wang Y et al. Lancet 2020

Oropharyngeal or nasopharyngeal samples

Sputum samples

Mean (SE)
Clinical Sensitivity Oropharyngeal or Nasopharyngeal Samples

- Of 196 patients with severe COVID-19, randomized to remdesivir or placebo, 19% (37/196) had undetectable viral RNA on nasopharyngeal or oropharyngeal swab.
Negative Predictive Value (NPV)

- Sample estimates used
  - 81% sensitivity, from Wang Y et al. *Lancet* 2020
  - 100% specificity (i.e., no false positives RT-PCR)
  - 1.3% of >1000 asymptomatic patients tested 0 to 2 days before procedure, University of Iowa
- Calculations
  - 1.6% prevalence = 1.3% / sensitivity
  - 99.7% NPV = \(\frac{1 - \text{prevalence}}{1 - \text{prevalence} \times \text{sensitivity}}\)

Negative Predictive Value (NPV) Implications for Care of 1 Patient

- Probability that when caring for an asymptomatic patient that the patient has COVID-19 is very small, 0.3%
- Testing all asymptomatic patients for COVID-19 is very effective and sound policy
- Calculations
  - 1.6% prevalence = 1.3% / sensitivity
  - 99.7% NPV = \(\frac{1 - \text{prevalence}}{1 - \text{prevalence} \times \text{sensitivity}}\)
Negative Predictive Value (NPV)
Implications for OR Management

• 90 patients per day undergo general anesthesia and enter phase I post-anesthesia care unit
• Tracheal extubation, coughing: sputum
Negative Predictive Value (NPV) Implications for OR Management

- SARS-CoV-2 detected plastic and stainless steel surfaces x 4 days, Chin AWH et al. *Lancet* 2020
- 90 patients per day × 4 days = 360 patients
- Probability ≥1 of 360 patients has COVID-19
  
  \[ 1 - (NPV)^{360} = 1 - (0.997)^{360} = 67\%
  \]
- Hospital-acquired infections by environmental contamination
Negative Predictive Value (NPV) Implications for OR Management

- SARS-CoV-2 detected plastic and stainless steel surfaces x 4 days, Chin AWH et al. *Lancet* 2020
- 90 patients per day × 4 days = 360 patients
- Probability ≥1 of 360 patients has COVID-19
  \[1 - (NPV)^{360} = 1 - (0.997)^{360} = 67\%
  \]
- Hospital-acquired infections by environmental contamination

Article with 136 References

- In my 10 minutes, I have described why there are challenges, but not management solutions
• Paper is principally about summarizing operating room management science
• Please read the paper for solutions, developed over 25 years of work by many investigators

Dr. Loftus Now Will Summarize Infection Control Strategies

Prevention of Perioperative COVID-19 Transmission

- ☐ Pre-procedure decolonize all patients
- ☐ Designate dirty areas
- ☐ Alcohol-based hand rubs on left IV pole
- ☐ Wire basket with zip closure bag on right pole
- ☐ Disinfectable, needleless closed IV catheters
- ☐ Double glove during induction
- ☐ Wipe down after induction per protocol
- ☐ Surveillance of ESKAPE transmission
COVID-19 Defense Strategy

Randy W. Loftus
University of Iowa
May 6th, 2020

Disclosures

- I am a founder and shareholder in RDB Bioinformatics, a company that owns OR PathTrac.

- I have received research support from BBraun, Sage Medical Inc., Draeger, and Kenall.

- I have presented at educational meetings for BBraun (APIC) and Kenall (AORN).

- Anesthesia Patient Safety Foundation Grant.
We in Anesthesia are Prepared to Defend

- Epidemiology of perioperative pathogen transmission has been studied for 12 years.


Strategy to Address Surgical Site Infections and SARS-CoV-2

- ESKAPE(Enterococcus, S. aureus, Klebsiella, Acinetobacter, Pseudomonas, and Enterobacter spp.) transmission parallels that which we know to be true for SARS-CoV-2.
- We have developed an evidence-based strategy for ESKAPE pathogens can be applied to help control perioperative spread of SARS-CoV-2.
  - Similar reservoirs of origin, modes of transmission
  - Antiseptics (povidone iodine and chlorhexidine gluconate) effective against SARS-CoV-2.
- Evidence-based strategy with dual purpose:
  - SSI prevention
  - Help to mitigate provider and patient risk in the COVID-19 era
Operating Room-A Complex
Patient Care Arena

Anesthesia

Relates to Patterns of OR Contamination

75-150 WHO opportunities per hour

Transmission of Pathogenic Bacterial Organisms in the Anesthesia Work Area

Increasing Environmental Contamination

Associated with Stopcock Contamination

confirmed in a multicenter study

Infection
- 8% (44) of 548 patients during the study period were infected.
- 30% of infected patients were linked to intraoperative bacterial reservoirs by PFGE.
  - Provider hands
  - Patient skin sites
  - Environment (including stopcock sets)

Mortality

<table>
<thead>
<tr>
<th>Contaminated Reservoir</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteremia</td>
<td>0.7 (0.1-3.4)</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>ASA</td>
<td>2.4 (0.8-7.6)</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Contaminated Stopcock</td>
<td>3.8 (2.0-7.2)</td>
<td>0.004</td>
<td></td>
</tr>
</tbody>
</table>

Epidemiology of Transmission

- Most potent transmission vehicle:
  - The *anesthesia work area environment*.
- Reservoirs that also contribute:
  - Patient skin sites (nasopharynx/axilla).
  - Provider hands.
- Complex interplay of reservoirs-multifaceted approach


- Controlled Before and After Study (time-trend study)
  - 114 Patients in randomized OR setting
    - 61 Control
    - 53 Treatment
  - Endpoints:
    - Baseline and case end environmental contamination
    - Stopcock contamination
    - Infection
  - 7-8 fold increase in hand washing
Improved HH Translated To:

**Reduced Environmental Contamination**

- **CFU Time 1 by Device**

**Reduced Stopcock Contamination**

- **% Positive Stopcock**

\[ *p < .006 \]

\[ *P < .001 \text{ OR } 5.98 \text{ CI } 1.78-25.6 \]

\[ \text{NNT} = 3.96 \]


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Improved HH Translated To:

- **13/61 (21%)** HAIs Bacterial Infections in control group.

- **2/53 (3.8%)** HAIs in Device group.
  - \((P < .007) \text{ NNT} = 5.7\)

**Catheter Care Station**

- Significant decrease in lumen contamination: (OR 0.79, 95% CI 0.63-0.98, P = 0.034).
  - 41% in the control group
  - 32% in the treatment group
  - ARR 9% s/p adjustment for patient and procedural covariates (OR 0.702, 95% CI 0.494-0.999, p=0.050).
  - NNT 11
- Reduction in HAI/Phlebitis (OR 0.592, 95% CI 0.355-0.988, p=0.045).
  - NNT 16.
- Solidified relationship between stopcock contamination and morbidity


**Improved Environmental Hygiene**

- Improved frequency and quality of cleaning:
  - high-risk period of induction (frequency)
  - a surface disinfection wipe leveraging a quaternary ammonium compound and ethanol (quality).
- Improved environmental organization: Clean vs. dirty environments
- 12 vs. 46% of cases reached the critical threshold of environmental contamination (100 CFU)
**Patient Decolonization**

- Bode et al. Randomized, placebo controlled trial, 917 patients colonized with *S. aureus* randomized to nasal mupirocin/chlorhexidine or placebo
  - 3.4% vs. 7.7% SSI (relative risk of infection, 0.42, 95% CI 0.23-0.75)

- Subsequent studies have confirmed efficacy of nasal mupirocin, povidone iodine, and chlorhexidine.

- Meta-analysis: For every 1,000 colonized patients that are effectively decolonized, 36 SSIs can be prevented

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**Surveillance Feedback: Mitigate Fatigue/Failure of Behavioral Interventions**

**MLST 5: USA100**

**MLST 8: USA300**

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We hypothesized that a multifaceted approach involving parallel improvements in hand hygiene, vascular care, patient decolonization and environmental cleaning, when optimized by *S. aureus* surveillance, would reduce *S. aureus* transmission events, and that as *S. aureus* transmission events were reduced, SSIs would fall.

We tested this hypothesis at Iowa in a RCT conducted from 9/20/18-9/20/19.

Transmission was associated with an increased risk of surgical site infection (11.0% [8/73] with transmission vs. 1.8% [3/163] without, risk ratio 5.95, 95% CI 1.62-21.86, P=0.007).

Treatment reduced the incidence of *S. aureus* transmission (incidence risk ratio 0.56; 95% CI 0.37-0.86, P=0.008; clustering by surgeon, 95% CI 0.42-0.76, P<0.001).

Approximately 4% of patients (11/236) suffered from surgical site infections, 7.69% in the control group (10/130) and 0.94% (1/106) in the treatment group.

Treatment reduced the risk of surgical site infection (Cox regression hazard ratio 0.12; 95% CI 0.015-0.918, P=0.041; with clustering by surgeon, 95% CI 0.027-0.506, P=0.004).
Improvement Correlated with Surveillance Feedback

Loftus et. al. JAMA Netw Open 2020.

SARS-CoV-2 Transmission

- Critical components of transmission.¹
  - Environment
  - Patients
  - Provider hands

- We recommend the application of our proven methods for SSI prevention to control of SARS-CoV-2 perioperative spread.²,³

- Increased transmission pressure with CoV-2.⁴
  - Patient and provider risk.

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⁴ Eggers M, Eckermann M, Ziem J. Rapid and effective virucidal activity of povidone-iodine products against Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Modified Vaccinia Virus Ankara (MVA). Infect Dis Ther. 2015;4:491–501.
Perioperative COVID-19 Defense Strategy

Thank you!

• Questions
Preparing for Elective Surgery in the COVID-19 Era

Daniel Burkhardt, MD
Associate Professor
Department of Anesthesia and Perioperative Care
University of California San Francisco

Disclosures

• I have no actual or potential conflict of interest in relation to this presentation
San Francisco COVID-19 Cases

- 2/25/20: Local emergency declared
- 3/5/20: First reported case in San Francisco
- 3/16/20: Stay at Home order issued
- 4/17/20: Policy on mandatory public face covering

Source: data.sfgov.org https://data.sfgov.org/stories/s/dak2-gvuj

UCSF COVID-19 Cases

Data as of 5/5/20
Resources Needed

- Bed/ICU capacity
  - Take into account physical distancing needs
- Perioperative staff availability
  - School closures etc
- Supplies
  - PPE, paralytics, blood products
- Testing capacity
  - Collection and processing
- Extra personnel
  - Order tests, track results, reschedule surgery
  - Phone/door symptom screens
    - For both patients and staff
- Resources for postoperative care, rehabilitation

Processes Needed

- Preoperative
  - Telehealth preoperative evaluations
  - Patient preoperative self-quarantine instructions
  - Visitor policy education
  - Multi-disciplinary system for prioritizing case scheduling
- Day of Surgery
  - Cohort test negative patients away from the untested
  - Social distancing
    - Break rooms, work areas, waiting rooms
  - Visitor restrictions
    - Impact on postop teaching and discharge
- Intraoperative care protocols depending on testing status

Controversies

- How soon before surgery to test?
- Use of faster but less sensitive tests (Abbott ID Now)
- Use of antibody tests
- Routine staff testing

Resuming Elective Surgery in the COVID-19 Era: UCSF Perioperative and Periprocedural Pathways

Tyler Chernin, M.D.
Assistant Professor of Anesthesia
University of California San Francisco
Disclosures

• I have no actual or potential conflict of interest in relation to this presentation

University of California San Francisco (UCSF) Health

• Parnassus Hospital: ~500 bed teaching hospital
  • 35 daily anesthetizing locations

• UCSF Medical Center at Mission Bay: ~300 bed teaching hospital
  • Benioff Children’s Hospital
    • 15 daily anesthetizing locations
  • Betty Irene Moore Women’s Hospital (~4000 deliveries per year)
  • Bakar Cancer Hospital
    • 15 daily anesthetizing locations

• Mount Zion Hospital
  • Traditionally a 23 hour stay surgery center, now refitted for inpatient COVID-related care (~53 beds between ICU and floor beds)
    • 10 daily anesthetizing locations

• UCSF Orthopaedic Institute
  • Ambulatory orthopedic procedures
    • 5 anesthetizing locations, 3 days per week
Prioritizing Surgical Case Scheduling

At UCSF, a multi-disciplinary team consisting of surgical, nursing, anesthesia and hospital leadership meet daily to review and approve scheduled cases.

Medically Necessary Time-Sensitive [MeNTS] Scoring System for prioritization is another option.

https://www.facs.org/covid-19/clinical-guidance/triage

PPE and Workflow Pathways with Universal COVID-19 PCR Testing

COVID+/Suspected Pathway
- Scenario 1

Asymptomatic Pathway
- Scenario 2
- Scenario 3
- Scenario 4

Asymptomatic COVID neg Pathway
- Scenario 5

- Case by case risk/benefit discussion between surgical and anesthesia teams on whether to proceed
- Identify preoperatively and isolate on Droplet Precautions
  - Patient wears standard surgical mask in isolation room/area
  - Providers wear standard surgical mask and eye protection
- Plan PPE and workflow according to Asymptomatic Pathway and Scenario (2, 3 or 4)
- Consider COVID-19 testing intraoperatively
- Patient is re-masked before exiting O.R.
- Recover in appropriate isolated PACU location on Droplet Precautions

PPE and Workflow Pathways with Universal COVID-19 PCR Testing

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Anesthesia Provider PPE</th>
<th>Surgery/Ringing/Scrub PPE</th>
<th>Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – COVID-19/PCR Confirmed for Non-surgery/procedure</td>
<td>Standard PPE + Face shield, gloves, or hair net</td>
<td>Standard PPE + Face shield, gloves, or hair net</td>
<td>See Scenario 1 worksheet scenario above</td>
</tr>
<tr>
<td>2 – Asymptomatic: patient WITHOUT TESTING WITHOUT COVID-19 surgery/procedure</td>
<td>Standard PPE + Face shield, gloves, or hair net</td>
<td>Standard PPE + Face shield, gloves, or hair net</td>
<td>See Scenario 2 worksheet scenario above</td>
</tr>
<tr>
<td>3 – Asymptomatic: patient WITHOUT TESTING WITHOUT COVID-19 surgery/procedure with general anesthesia</td>
<td>Standard PPE + Face shield, gloves, or hair net, or mask for surgery placement</td>
<td>Standard PPE + Face shield, gloves, or hair net, or mask for surgery placement</td>
<td>See Scenario 3 worksheet scenario above</td>
</tr>
<tr>
<td>4 – Asymptomatic: patient WITHOUT TESTING WITHOUT COVID-19 surgery/procedure WITHOUT general anesthesia</td>
<td>Standard PPE</td>
<td>Standard PPE</td>
<td>See Scenario 4 worksheet scenario above</td>
</tr>
<tr>
<td>5 – Asymptomatic: patient WITH CONFIRMED NEGATIVE COVID-19 surgery/procedure</td>
<td>Standard PPE*</td>
<td>Standard PPE*</td>
<td>See Scenario 5 worksheet scenario above</td>
</tr>
</tbody>
</table>

*Providers may exit to don NIJ/NIOSH as long as they are re-used and stored in accordance with UOF Health/NIOSH PPE reuse policies.

Asymptomatic Pathway

- Scenario 2
- Scenario 3
- Scenario 4
Asymptomatic Pathway

- **Scenario 2**: high-risk procedures
  - All team members don full contact, droplet and airborne PPE for the entire duration of the case
  - Anesthesia providers should elect to avoid mask ventilation in favor of a rapid sequence intubation with endotracheal tube, when feasible
  - Teams should wait 15 minutes after an aerosol-generating medical procedure (AGMP) is finished to allow for appropriate air turnover before exiting the O.R. location.
  - Clear signage placed at all O.R. entrances

- **High-Risk Surgeries/Procedures**:
  - Any procedures on the airway, throat, mouth or sinuses (bronchoscopy, tracheostomy, glossectomy, laryngoscopy procedure...etc)
  - Endoscopy/ERCP, TEE, ECT
  - Thoracic surgery/procedures

PPE and Workflow Pathways with Universal COVID-19 PCR Testing
Asymptomatic Pathway

- **Scenario 3:** low-risk procedure requiring general anesthesia
  - Anesthesia providers don full contact, droplet and airborne PPE for airway placement, manipulation (if necessary) and removal
    - Anesthesia providers should elect to avoid mask ventilation in favor of a rapid sequence intubation with endotracheal tube, when feasible
    - At these times, the other members of the team must leave the O.R. and wait outside for 15 minutes after completion
    - After that, other team members can return and wear standard PPE (standard gown, eye protection, gloves)
    - For procedures where a 15 minute wait could seriously hinder care, providers should follow the procedure for high-risk surgery (Scenario 2)
  - During extubation, all other providers should leave the room and wait outside for 15 minutes while the patient remains in the O.R.

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**PPE and Workflow Pathways with Universal COVID-19 PCR Testing**

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<th>Scenario</th>
<th>Anesthesia Provider PPE</th>
<th>Surgery/Recovery PPE</th>
<th>Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - COVID-19 positive for non-surgical procedures</td>
<td>Standard PPE*</td>
<td>Standard PPE*</td>
<td>See Scenario 4, 5, 6, and 7, standard pathways.</td>
</tr>
<tr>
<td>2 - Asymptomatic patient WITHOUT TESTING WITHIN 6 SAMS for high-risk surgery/procedure</td>
<td>Standard PPE</td>
<td>Standard PPE</td>
<td>See Scenario 2, 3, 4, 5, 6, and 7, standard pathways.</td>
</tr>
<tr>
<td>3 - Asymptomatic patient WITHOUT TESTING WITHIN 6 SAMS for low-risk surgery/procedure</td>
<td>Standard PPE</td>
<td>Standard PPE</td>
<td>See Scenario 2, 3, 4, 5, 6, and 7, standard pathways.</td>
</tr>
<tr>
<td>4 - Asymptomatic patient WITHOUT TESTING WITHIN 6 SAMS for low-risk surgery/procedure WITHOUT general anesthesia</td>
<td>Standard PPE</td>
<td>Standard PPE</td>
<td>See Scenario 2, 3, 4, 5, 6, and 7, standard pathways.</td>
</tr>
<tr>
<td>5 - Asymptomatic patient WITH CONFIRMED NEGATIVE TEST WITHIN 6 SAMS for any surgery/procedure</td>
<td>Standard PPE*</td>
<td>Standard PPE*</td>
<td>See Scenario 4, 5, 6, and 7, standard pathways.</td>
</tr>
</tbody>
</table>

*Providers may return to duty (NURSHP) as long as they are re-used and stored in accordance with Uche PPE reuse policies.
Asymptomatic Pathway

• **Scenario 4:** low-risk procedure **NOT requiring general anesthesia**

• **Standard PPE** can be worn by all team members
  
  • If providers anticipate a high likelihood of requiring deep sedation and a general anesthetic option is deemed safe, consider following **Scenario 3** and performing general anesthesia from the start
  
  • Providers may elect to don N95/PAPR as long as they are re-used and stored in accordance with UCSF PPE reuse policies

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**PPE and Workflow Pathways with Universal COVID-19 PCR Testing**

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*Providers may elect to don N95/PAPR as long as they are re-used and stored in accordance with UCSF PPE reuse policies.*
Asymptomatic Patients With Confirmed Negative COVID-19 Testing for Elective Surgery

- **Scenario 5:** asymptomatic patients with a confirmed negative COVID-19 RT-PCR test obtained within 4 days of the procedure

- Based on an estimated COVID-19 prevalence around 1% in San Francisco and a sensitivity/specificity of a NP swab test estimated at 75%/98%, the negative predictive value of a negative test is 99.7%

- **Standard PPE** and “pre-COVID” workflows can be used for any type of surgery
  - Providers may elect to don N95/PAPR as long as they are re-used and stored in accordance with UCSF PPE reuse policies
  - Careful attention paid to avoid cohorting these patients with patients of unknown COVID-19 status throughout the perioperative period (pre-op, PACU...etc)

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Wait Times after Aerosol-Generating Procedures

**Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency**

<table>
<thead>
<tr>
<th>ACH (cfm)</th>
<th>Time (mins.) required for removal 90% efficiency</th>
<th>Time (mins.) required for removal 99.9% efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>138</td>
<td>207</td>
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</tr>
</tbody>
</table>

*This table is revised from Table S3-1 in reference 4 and has been adapted from the formula for the rate of purging airborne contaminants presented in reference 1425.

**Air Changes/Hour (ACH):**

- UCSF Infection Prevention Policy on AGMPs:
  - COVID Unknown Patients: Wait time necessary for 99% turnover based on ACHs
  - COVID +/Suspected: At least one hour or more in most locations
  - All O.R.s are positive pressure environments

- Many Non-OR Anesthesia (NORA) procedure rooms have lower ACHs than conventional O.R.s
Controversies

• Pediatric patients presenting for multiple/daily procedures within a discrete time frame
  • Longer window acceptable assuming stable clinical status and lack of exposures

• Inpatients who test negative on admission
  • Currently being tested on Q7day schedule unless change in clinical status

• What to do with patients who refuse testing?

Thank you!